

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: GEUN-YOUNG YEOM, ET AL.
FOR: ETCHING APPARATUS USING NEUTRAL BEAM

PRELIMINARY AMENDMENT

The Assistant Commissioner of
Patents and Trademarks
Washington, DC 20231

Dear Sir:

Prior to the Examiner acting in the above-referenced application, please
preliminary amend the claims as follows:

IN THE CLAIMS:

Please replace claims 1-7 and 10 with the following re-written clean version.

1. (Amended) An etching apparatus using a neutral beam comprising:
an ion source for extracting and accelerating an ion beam having a predetermined
polarity;
a grid having a plurality of grid holes through which the ion beam passes;
a reflector having a plurality of reflector passages, the reflector passages
communicating with the grid holes such that the ion beam passed through the grid holes
is reflected by surfaces of the reflector passages and neutralizing the ion beam into a
neutral beam; and
a stage for placing a substrate to be etched in a path of the neutral beam.

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2. (Amended) The etching apparatus of claim 1, further comprising a retarding grid disposed between the reflector and the stage.
3. (Amended) The etching apparatus of claim 1, wherein the reflector passage has a circular section.
4. (Amended) The etching apparatus of claim 1, wherein the grid has a cylindrical shape and the reflector has a cylindrical shape.
5. (Amended) The etching apparatus of claim 1, wherein the reflector passages are slanted with respect to an advancing direction of the ion beam so that the ion beam passing through the grid holes and advancing straight is reflected by the surfaces of the reflector passages.
6. (Amended) The etching apparatus of claim 5, wherein the reflector passages are non-parallel with a central axis of the reflector.
7. (Amended) The etching apparatus of claim 5, wherein the reflector holes are parallel with a central axis of the reflector and the reflector is slantingly connected to the grid.
10. (Amended) The etching apparatus of claim 5, wherein an angle between a central axis of the reflector passages and the advancing direction of the ion beam is from 5° to 15° .

Please insert the following newly added claim 11.

11. (Newly Added) The etching apparatus of claim 3, wherein the circular section of the reflector passage has a diameter which is equal to or greater than that of the grid hole.

REMARKS

Applicants request entry of the above-identified amendments which conform the claims to U.S. practice. No new matter is being introduced by this Amendment as antecedent support is set forth in the specification and the original claims.

Prosecution on the merits is respectfully requested.

If there are any charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,
GEUN-YOUNG YEOM, ET AL.

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Applicants' Attorney

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28 FEB. 2002

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Version with Markings to Show Changes Made

Claims 1-7 and 10 are amended herein as follows.

1. (Amended/Marked up) An etching apparatus using a neutral beam comprising:
 - an ion source for extracting and accelerating an ion beam having a predetermined polarity;
 - a grid [positioned at the rear of the ion source and] having a plurality of grid holes through which the ion beam passes;
 - a reflector [closely attached to the grid and] having a plurality of reflector [holes] passages, [corresponding to] the reflector passages communicating with the grid holes [in the grid, the reflector for] such that [reflecting] the ion beam passed through the grid holes is reflected by surfaces of [in] the reflector [holes] passages and neutralizing the ion beam into a neutral beam; and
 - a stage for placing a substrate to be etched in a path of the neutral beam.
2. (Amended/Marked up) The etching apparatus of claim 1, further comprising a retarding grid [installed] disposed between the reflector and the stage.
3. (Amended/Marked up) The etching apparatus of claim 1, wherein [the diameter of] the reflector [holes] passage [is equal to or greater than the diameter of the grid holes] has a circular section.
4. (Amended/Marked up) The etching apparatus of claim 1, wherein the grid has a cylindrical shape [and a protrusion at the rear edge thereof,] and the reflector has a cylindrical shape [and a protrusion, which is inserted into the protrusion of the grid, at the front edge thereof].

5. (Amended/Marked up) The etching apparatus of claim [4] 1, wherein the reflector [holes] passages are slanted [at a predetermined angle] with respect to [the straight] an advancing direction of the ion beam so that the ion beam passing through the grid holes and [going] advancing straight is reflected [in] by the surfaces of the reflector [holes] passages.

6. (Amended/Marked up) The etching apparatus of claim 5, wherein the reflector [holes] passages are [slanted at a predetermined angle] non-parallel with [respect to the center line] a central axis of the reflector [in the reflector].

7. (Amended/Marked up) The etching apparatus of claim 5, wherein the reflector holes are parallel with [respect to the center line] a central axis of the reflector [in the reflector] and [the height of the protrusion of] the reflector is slantingly connected to the grid [slanted at a predetermined angle along the outer circumference of the reflector].

10. (Amended/Marked up) The etching apparatus of claim [1] 5, wherein [the ion beam is incident on the surfaces] an angle between a central axis of the reflector [holes] passages [in the reflector at an angle of incidence within a range of] and the advancing direction of the ion beam is from 5° [-] to 15°.